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ABSTRACT OF THE DISCLOSURE

A reactor comprising a body made of a heat-resistant material and having an inlet and an outlet for water/moisture gas, having a gas-diffusing member provided in an internal space of the body, and having a platinum coating on an internal wall surface of the body. Hydrogen and oxygen fed from the inlet are diffused by the gas-diffusing member and then come into contact with the platinum coating to enhance reactivity, thereby producing water. A temperature of the reactor is held to be below an ignition temperature of hydrogen or a hydrogen-containing gas. The platinum-coated catalyst layer on the internal wall of the reactor body is formed by treating the surface of the internal wall of the body, cleaning the treated surface, forming a barrier coating of a nonmetallic material of an oxide or nitride on the wall surface, and forming the platinum coating on the barrier coating.